

SOME CONSIDERATIONS ON VISCEROPTOSIS. AN HISTORICAL REVIEW.*

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The literature upon visceroptosis is so voluminously comprehensive that a detailed and exhaustive consideration would be impracticable. The writer will, therefore, present only the terse views of various collaborators from 1885, since which time the contributions upon splanchnopotosis have assumed a more assimilable form.

It is to Glenard that the profession is indebted for first calling attention to this disease. In his article (156) and in his contributions (157-170) through subsequent years to 1903, he repeatedly emphasized the anatomical dissociation of the normal abdominal relationship, the ptoses of various organs, and that train of symptom-complexes, neurasthenia emaciation and nervous phenomena which are the subjective manifestations of this dislodgment and functional inactivity. Although Virchow some twenty-two years previously had written historically upon "Unterleibs-Affect" (A) and Kausmaul (B) had also presented views along the same line, it was Glenard's scientific, excellent and historical investigations that have given an identification to the disease of splanchnoptosis.

ETIOLOGY.

THE INFLUENCE OF THE KIDNEY ON VISCEROPTOSIS.—The writer had the opportunity before your body at its last meeting of presenting some views upon nephroptosis, and at that time gave statistics of various investigators to show the frequency of the condition. Harris states that fifty-six per cent. of all women have dislocated kidney on one or both sides.

Edebohls finds twenty per cent. of his patients with dislocated kidney. Godart-Danhieux from observation upon 603 women found thirty-five per cent. of them with a transgressing organ. Newman states that in 290 cases of floating kidney, 252 were in women and 38 in men, a proportion of about 7 to 1. And he also states that the right kidney is much more frequently affected than the left. In 173 cases 152 were on the right side, 12 on the left and nine involved both organs.

Henry Morris makes a similar statement. Litten and Israel claim that 85 per cent. of all dislocated kidneys are in women. Kuster states that a dislocated kidney exists in 94 per cent. of all women and six per cent. of men. Although this latter statement seems extravagantly high, abnormal mobility of the kidney is no rarity, is most frequently seen in women, and in those who have borne children.

The normal physiologic respiratory excursion of the kidney is one to one and a half inches. Therefore to speak of a movable kidney as one of pathological import is a misnomer. A dislocated kidney is one that oversteps these bounds, and, according to Glenard, movable kidneys may be of the following degrees:

First, is that in which the lower pole of the kidney can be felt on deep inspiration but recedes with expiration.

Second, in which a greater portion of the kidney, but not the upper pole, can be palpated.

Third, the upper pole can be palpated on deep inspiration.

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Fourth, the entire organ is palpable during inspiration and expiration. These two latter divisions belong obviously in the dislocated class.

The kidneys lay behind the peritoneum on either side of the vertebral column, and, according to Wolkoff and Delitzen, who have made a particular study of their anatomical anchorage, these organs are more or less securely fixed in normal paravertebral recesses. These recesses (Robinson, 403) in which the organs lie, do not hold the kidney fixed but act as a cylinder in which the piston (kidney) plays up and down. The restraint, help and support of these recesses can be demonstrated in a very striking manner by plaster paris casts. If they are well developed they tend to prevent abnormal motion of the kidney, for they are funnel-shaped in the well developed male subject, smaller below and equally deep on the right and left sides of the vertebral column. In the female subject they are shallower and cylindrical, rather than the usual funnel shape, and in those cases in which the kidneys are dislocated the recesses are remarkably shallow, this holding peculiarly true for the right side of the body. Women have not the muscular development of men.

The kidney is surrounded by a considerable amount of areolar tissue often loaded with fat, which capsula adiposa is constantly found in greater quantities about the margins of the organ and to a lesser extent anteriorly and posteriorly. This is derived from the parietal portion of the extra peritoneal areolar tissue. In some cases the fat in this enveloping membrane will be very abundant. In others, the fat is so scant in quantity that the connective tissue forms a thin translucent covering which might readily be taken for peritoneum or transversalis fascia. In other instances the fatty capsule is so large and so loosely connected with the kidney that the organ has room for movement within it. In still other cases the tissue surrounding the kidney is so loosely attached to the peritoneum

and posterior abdominal wall that the whole mass is free to move, the extent of movement in this instance being limited only by traction on the vessels. In prolonged illnesses, wasting diseases and general emaciation there must necessarily be some absorption of this fatty capsule as there is absorption of fat in other parts of the body. And the writer believes that this capsula adiposa possesses absolutely no restraining influence upon the organ; if anything tends to its further dislocation by virtue of increased weight. Wm. Anderson, F. R. C. S. (C) at the annual meeting of the British Medical Association in Carlisle, July, 1896, discussed the function of the subperitoneal tissue and stated "structurally the subperitoneal tissue consists of highly elastic areolar tissue containing fat and transversed by bands of unstriped muscular fibre. In an average subject the areolar tissue varies in amount from a thick accumulation loaded with fat, as about the kidney, in the great omentum, mesentery, and in the cavum Retzii, to a gauzy film that may be easily taken for the peritoneum, when covered with laminae its interstices are of the nature of lymph spaces."

As an instance of its higher and only muscular organization the ligamentum suspensorium of Treitz, shows a true sustentaculum support, but histologically this areolar gauzy structure, frequently devoid of muscular bands and sustentacular aid, saturated in its dependencies with fat, inelastic, non-resistant and soft, certainly offers no restraining influence upon any organ which it may invest.

Embedded in the soft fatty substance surrounding the kidney is a layer of fibrous tissue to which the term "fascia renalis" is applied. This fascia surrounds the kidney and a considerable amount of the fatty capsule in the form of a sheath in which may be distinguished anterior and posterior walls. The sheath is open, deficient, gaping inferiorly and anteriorly, but closed above and to the outer side of the kidney by the apposition of its walls. The inviting line for dislocation of the kid-

ney, therefore, is essentially downward. The anterior inferior face of the kidneys for about two inches of its extent is intimately bound by fascial bands to the large colon—the hepatic flexure—which in turn, running through the great omentum is suspended only by that atonic areolar structure from the greater curvature of the stomach. And again, along the anterior and inner concave border of the kidney the duodenum is attached as it makes its bend in coming from the stomach.

The writer has entered into the anatomical site and the anchorage purposely as the influence and the mechanical significance of the kidneys, with support absent below and internally, constantly dragged upon by the unyielding colon and uterus inferiorly, must be transferred to the pyloric end of the stomach to which it is densely attached through the medium of the duodenum. Insufficiently immobilized primarily, by failure of closure of the fascia renalis inferiorly and internally, enjoying an unusual (piston and cylinder) physiological respiratory excursion, aggravated by pulmonary lesions and contractions of the diaphragm as in the act of coughing, sneezing, urination, defecation, deep breathing, singing, etc., distressed by the encroachment of enlarged neighboring organs, insulted by the constricting pressure of thoracic stays, supported by no ligaments, bands or peritoneal bridges, influenced constantly by gravity, pulled upon by the inelastic, dragging ureter, which is fixed below, and is constantly undergoing its rhythmical peristaltic waves from above downward, and finally the dead weight of the pulling hepatic flexure of the colon, seem to be of sufficient mechanical significance to explain this dislodgment which, according to some authorities, occurs in eighty per cent. of all women.

The association of dislocated kidney with the sinking of other abdominal organs, of the stomach in particular, has been firmly established. Nephroptosis is constantly identified

with gastropptosis (Aaron I.), the colon and the small intestines (Arneill 10), Kumpf (258) in 1893 reported 100 cases of enteroptosis and in the attending nephroptosis he has always found a constantly subjective symptom in the form of a characteristic form of pain. From the navel to the greatest convexity of the arch of the ribs, suppose a line to be drawn, at an equal distance from the end of this line, in an angle of 110 degrees above—toward the epigastric wall—an energetic pressure is to be made, so that the finger tips press in against the abdominal wall close to the vertebral column, a cry or movement of pain always shows the presence of nephroptosis.

Godart-Danhieux (173) says, systematic research has demonstrated the greater frequency of nephroptosis than has been supposed. Mathieu among 306 women has found 27 per cent to 28 per cent. Fischer and Benzen finds the mobility of the kidney to be 17 per cent and 22 per cent, and he further says that Glenard in 1887 indicated the fact that a movable kidney without having any real pathogenic value was of great importance semeiologically. The ptosis of the kidney is a phenomena which accompanies splanchnoptosis. Robinson (403) in speaking of the etiology of nephroptosis says the main causes are (a) a predisposing body-form, (b) rapid loss of perineal fat, (c) rapid repeated gestations, (d) heredity-inferior anatomy and physiology, (e) yielding of diaphragm supports, (f) debilitating disease, and form of the renal fossa. This varies in different subjects. The narrower the distal end of the renal fossa the more immovable the kidney.

Schwerdt (438) states in the first month of 1896 he observed 95 cases of enteroptosis, six men and eighty-nine women. One patient showed an almost total enteroptosis but lacked the sinking of the spleen. In sixty-nine cases the stomach was displaced and atonic. Nephroptosis was present in eighty-six cases, on the left side four times.

THE INFLUENCE OF THORACIC BINDERS, CORSETS,
STAYS, ETC., AS AN ETIOLOGICAL FACTOR
FOR SPLANCHNOPTOSIS.

Wolkoff and Delitzen state that a tight band at the level of the ninth or tenth rib diminishes the depth of the renal recesses and thus favors nephroptosis. Senator calls attention to the elongation of kidney recesses and the absorption of perirenal fat by tight lacing.

Turck (503) considers the displacement of the colon largely due to the following general etiology: (1) Any condition that induces an increased capacity in the abdominal cavity. (2) Constriction of the thorax.

Cukor (80) says, regarding the role that woman's corset play in the disease of enteroptosis, is very important, not only in the local compression of the waist and in the atrophy following local pressure of the abdominal muscles, but in the fact that the constant pressure on the waist causes increased pressure abdominally, and leads to the sinking of the intestines and the neighboring organs. Measurements taken after the removal of the corset showed an increase in the abdominal circumference of from five to ten cm. The dislocating influence of the corset shows itself in time as a permanent deformity of the abdomen.

Gallant (148) speaks of the heavy skirt hanging at the waist and the constant pressure of the corset. As the spinal column lengthens it should carry all the viscera attached thereto upwards, but this compression at the waist line prevents it, the ligaments are stretched and the viscera disorted.

Senni (442) according to his practical experience is of the opinion that the etiology of hepatoptosis rests principally and conclusively upon the mechanical pressure of the corset and thus the liver must be forced under the vertebral arch.

Morris (335) says splints cause muscular atrophy in other parts of the body, why not

in the abdomen by the use of corsets. The influence which hepatoptosis plays in the picture disease of splachnoptosis and the etiology of the dislocation of the liver is, according to Robinson (402) as follows: Hepatoptosis is part and parcel of splachnoptosis and depends on the same causes. The elongation of the hepatic ligaments are secondary to the relaxation of the abdominal wall. Further etiologic factors in hepatoptosis are the weight of the liver, cholelithiasis, weight of the gall bladder, laxity of elongation of the hepatic ligaments, trauma, as during childbirth, and disappearance of the visceral shelves. The chief immediate cause is relaxation of the ventral abdominal wall.

Ssaweljew (452) says, Kispert is of the opinion that the ligaments of the liver lose their strength through malnutrition and their relaxation follows.

Soupault (450) states that the numerous explanations of the cause of the mobile liver are not satisfactory as they do not fit every case. In fact all movable livers cannot be explained by one and the same pathogenia. It has been explained in two ways: (1) The liver is mobile because it is poorly sustained. (2) The liver is mobile because it is deformed. The good condition of the abdominal wall (anterior) plays a very important part in maintaining the liver in a normal position. When the strength of that is diminished (as in enteroptosis) the liver is influenced by the loss of support to descend more or less into the abdomen. The sanguine tension (intra hepatic) contributes also to erect the lower border of the liver, and to maintain it in the upper part of the abdomen. To explain hepatoptosis, all authors invoke alterations in the different organs which sustain the liver. Longuet and Kirmisson signal the congenital absence of the coronary and lateral ligaments, while Lannelongue signals the absence of the suspensory ligament, but these are exceptional facts.

Francine (143) states it is impossible to separate gastropptosis from enteropptosis or a general splanchnopptosis, these conditions in their etiology and clinical manifestations complement each other. Dislocation of the liver is a very important factor in both enteropptosis and gastropptosis. It is difficult to diagnose and so is often overlooked. The relative frequency of this condition (gastropptosis) in the sexes is four or five in women to one in men.

Morris (335) says: Examination of many women with loose abdominal walls proves that the rectus abdominis muscles, seized in two hands, can be easily drawn apart for several inches. The hollow viscera then cease to do their work of supporting the liver and this viscus begins to descend. Suspensory and falciform ligaments elongate. The vena cava is deeply lodged in the substance of the liver, and at this point receives the hepatic veins. The liver fixed at the vena cava descends through the curve of the axis rotation, duodenum, pylorus and hepatic flexure of the colon go with it. The axial rotation of the liver brings the posterior lower border of the liver against the upper pole of the right kidney, and if this viscus is not already loose it now becomes so by the impact of the liver. When the hepatic flexure of the colon descends it is followed by the transverse colon.

Glenard (167) says the ptosis of the liver is due to a leveling; it may be lateral or it may be antero-posterior, under the influence of a reduction of the intestinal mass of the abdominal cavity and the diminution of the sanguine tension (intra-hepatic) or to a hypertrophy, a hyperemia, or a steatosis.

Binnie (32½) observes that Terrier and Auvray in their article on the floating liver, refer at length to the function of the inferior vena cava as a support to the liver. This, according to Faure, by its close adherence to the central tendon of the diaphragm, plays an important role among the hepatic supports. Faure

found that a force of 35-40 kilogrammes is necessary to tear the liver from the diaphragm, but when the inferior vena cava is divided, a force of 20 kg. suffices for the same purpose. From his experiments he is of the opinion that the pressure of the abdominal wall and of the intestines is a feeble support to the liver, only sufficient to prevent that organ pulling too heavily on its ligaments and to a certain extent diminishing the strains which the liver cannot fail to give its ligaments during sudden bodily movements. Landon believes the primary defect in hepatopptosis to be a distention of the belly wall.

Bouveret (46) states a certain fact in the history of enteropptosis that is little known. This is the distension of the biliary vesicle, without neoplasm or calculi, and is coincident with a marked descent of the liver. It is interesting to learn the role which this rare tumor plays in the clinic. He has met four of these cases in three years. The subjects were all women with advanced enteropptosis. In one case the right liver lobe elongated as if strangled, descended and formed a tumor in the right iliac fossa. The left kidney was sunk at the same time. The other abdominal organs were all loosened, particularly the transverse colon. The patient did not complain of the liver, nor of the vesicle. She had no hepatic colics. She had abdominal malaise, rather than real pains, was exceedingly constipated. Had all the symptoms of enteropptosis. This cholecystocele did not occupy the same position in all the subjects. The liver disturbances lengthened the vesicle and its normal supports. In one case the vesicle was in the epigastrium at the right of the umbilicus, and enlarged enough to raise the abdominal wall perceptibly. In another patient it had descended into the right hypochondria, near the right kidney, with which it could have been confounded. In another case it might have been taken for the ascending colon or even for the caecum. The size was also variable. In one instance it was the size of a hen's egg.

THE INFLUENCE OF THE ABDOMINAL WALL ON VISCEROPTOSIS.

Having considered the anatomic intimacy of the kidney with the pyloric end of the stomach and its influence upon that tube on being dislocated also the aggravating factor of hepatosis upon visceroptosis, the writer submits the testimony of the following contributors upon abdominal weakness as a potent factor in the causation of visceral ptosis:

Cseri (75) has made many observations on the disease (enteroptosis) and is inclined to the opinion that it is congenital. The most convincing proof is that in the majority of his cases he has observed a curve in the lumbar segment of the spine.

Hemmeter (208) finds the etiology of enteroptosis a very difficult question, but is rather in favor of the theory of Rosengart, in the pathologic reversion of the location of the abdominal organs to the embryonic state, at least in congenital cases. He has found Stillér's sign of the tenth floating rib present in 78 out of 130 cases.

Robinson (400) says the etiology and development of the splanchnoptosis depends on the assumed base; whether splanchnoptosis be due to (a) congenital predisposition; (b) acquired defects; (c) reversion of embryonic conditions, or (d) a combination of the three preceding factors. In congenital predisposition there is inherent weakness or fragility of tissue. Acquired defects come from life's opposing forces. Reversion would be constitutional predisposition and therefore belong to (a). But the view which includes the combined factors is the more rational, because the disease is prevalent among all nations.

Stillér (460) discusses the nature of enteroptosis and concluded that it is a congenital anomaly. It occurs in early life as a consequence of congenital relaxation particularly of the ligaments. One of the certain indications is abnormal mobility of the tenth rib. This is due to fibrous instead of cartilaginous junction of the rib with the sternum.

Cumston (83) says heredity has been considered a predisposing cause for ptosis of the abdominal viscera but there is a very important and more general cause, and that is disturbances in nutrition, manifested by a particular condition of the fibrous tissue, allowing it to become distended and non-resistant.

Smith (447) says that enteroptosis is characterized by flabbiness of the tissues, by a lack of bodily energy, and by more or less backwardness of development. Such patients have a long narrow, more or less collapsed thorax, flaccid abdominal walls, prominent abdomen, changes in the character of the spine, and a general relaxation of muscular and connective tissue. Abnormal light bodily weight as the rule. The intercostal spaces are increased in the upper part of the thorax, but not below. The middle zone of the trunk is slightly increased in length.

Keith (124) has made most painstaking anatomical investigations and thrown some light upon this disease. These are his conclusions in brief: (1) The contraction of the diaphragm is the factor which produces the displacement of the viscera in enteroptosis, and that of the various parts of the muscle (the crura) are the most important in producing this result. (2) The "thoracic" supports of the diaphragm must have yielded or the antagonistic abdominal muscles have been weakened before the displacement can take place. (3) The bands which fix the viscera to the walls of the abdomen are of quite subsidiary importance.

Moren (333) states that Webster regards the separation of the recti muscles and the stretching of the linea alba as a most important etiological factor in visceroptosis.

Vietor (511) has made a careful study of the development of the abdomen in animals and in man, in adults and in pre-natal and infantile life, and has established the proposition that the fundamental cause of splanchnoptosis is abdominal incompetence. If well developed, the abdominal walls not only contain the vis-

cara, but also retain them in position against gravity and other displacing forces. This is the competent abdomen. Competence of the abdomen is a developmental factor. It is a very unstable possession. In most individuals it is never attained, and when attained there is a constant predisposition to a reversion to a more or less incompetency. The tendency is more marked in the fourth decade and beyond.

Meltzing (329) believes the cause of visceroptosis to be the insufficiency of muscular tone of the abdominal wall.

Keith (239) believes that the displacement of the liver and stomach springs from two causes—either from relaxation or paresis of the abdominal muscles or, as is more frequent, the body cavity is constricted by the clothing so that normal respiration is impeded. In either case the visceral displacements are much the same.

Webster (532 1-2) claims that one important factor in the relationship of the abdominal and pelvic contents is the abdominal wall. Its fascial and muscular layers (its most important tissues) have a certain degree of tonicity which helps to maintain the trunk position, and to exert pressure on the abdominal contents. It shares this latter function with the diaphragm and pelvic floor.

Langerhans (268) considers gastropptosis due to various causes: relaxation of abdominal muscles being chief. He also believes that nervous dyspepsia may lead to gastropptosis and thinks there is a hereditary tendency to gastropptosis.

Davis (88) says the abdominal wall and the suspensory ligaments of the abdominal viscera have a certain mutual influence upon each other. In the act of lifting a heavy burden the abdominal ligament shorten, and when the ligaments have an extension, in consequence of the overfilling of the intestines, the muscles of the abdominal wall serve as a support. When this mutual action is interrupted either by a chronic weakness of the ligaments or wall gastropptosis is the result.

Bassler (22) attributes many cases of gastropptosis in women to the failure to properly support the abdomen after the patient leaves the bed following childbirth.

Treves (489) believes that abdominal ptosis, visceroptosis or enteroptosis depend upon a relaxation of the abdominal wall, and of the supporting ligaments of the viscera. The result is that the organs drop to a lower level in the abdomen.

Cseri (75) says the right transverse flexure of the colon, flexor hepatica, in consequence of the insufficiency of the weak, colico hepaticum, on which it is attached, sinks. In consequence of this descent there ensues a kink or angle where the ascending colon crosses the transverse colon. This, in the first place, causes a stoppage of the intestinal contents and in the second brings on an array of dyspeptic symptoms. The insufficiency of this ligament and the consequent descent of the flexor is, in Glenard's opinion, the point of origin of the entire disease. The fallen colon pulls on the ligament and we have a sinking of the stomach (gastropptosis), of the kidneys (nephropptosis) and of the liver (hepatopptosis). This finally resolves itself into the sinking of the entire viscera (splanchnopptosis).

If the views of Cseri were reversed and put at the door of the aberrant kidney as the original mechanical explanation of the sinking of the hepatic flexure, the question of colopptosis would assume a much more rational solution. If the kidneys were fixed, the flexura hepatica could not sink. The kidney prolapsing downward and inward, however, carries with it the colon, the omentum, the pylorus and the stomach.

THE INFLUENCE OF THE SPLEEN ON VISCEROPTOSIS.

Brown (51) says a movable spleen is usually present in colopptosis. It is not always recognized on account of the difficulty of diagnosis. If the organ is abnormally fixed, diagnosis is still more difficult.

Glenard (167) states that the analysis of twenty-seven cases of splenoptosis (upon 1,500 patients) confirms the theory that all cases of splenoptosis are accompanied by hepatosis, and more than that, that splenoptosis never exists alone.

A wandering spleen is only restricted by its peritoneal and properitoneal connective tissue belt.

THE INFLUENCE OF THE PANCREAS ON VISCEROPTOSIS.

There is no literature upon ptosis of the pancreas as an accompaniment to splanchnoptosis. With marked prolapse of the pylorus the head of the pancreas is bent about itself and kinked. Calculous formation, retention, cystic degeneration, interstitial pancreatitis develop to a degree determined by the angulations of the ducts of Wirsung and Sanborini.

PATHOLOGY.

It is evident that each abdominal organ cannot be taken up separately.

Robinson (401) in the examination of 600 adult autopsies found local peritonitis adhesions in over 80 per cent. The neuro-vascular visceral pedicle, the mesentery, becomes elongated and its roots glide distal-wards on the dorsal abdominal wall. This allows (a) elongation of the mesentery, (b) an excessive range of the visceral motion, (c) the abdominal and the pelvic organs pass distal-ward and become impacted in the pelvis, (d) splanchnoptosis compromises circulation and deranges absorption secretion, (e) disorders peristalsis, (f) traumatizes nerve periphery, (g) impairs nourishment, (h) produces indigestion, (i) invites constipation. After thirty-five years it is likely to cause stenosis or partial obstruction of the canals, tractus intestinalis, and elongation of other parts.

Davis (88) states that one of the principal

causes is a general malnutrition. In consequence of the extension of the ligaments of the intestines the blood vessels naturally lengthen and there is circulatory obstruction in them. Nerves in the muscles are lengthened with them and pain arises. Narrowing of the peristaltic nerves and the unphysiological status of the intestines causes constipation.

Morris (335) has found that the large branches of the solar plexus from the liver, kidney and bowel are irritated, so that in addition to the mechanical disturbances of the viscera, a train of reflex disturbances of the sympathetic system, add to the distress, and there are various functional disorders.

Turck (503) states that in many cases there are no symptoms and in some cases of coloptosis the symptoms disappear but the ptosis remains. There are, however, permanent mechanical disturbances due to prolapse—viz.: dragging on the mesentery, pressure on the kidney and visceral muscle weakness, giving rise to chronic irritation of nervous symptoms with hysteria and neurasthenia.

Robinson (404) makes the following observation that the dilation of the stomach and duodenum (gastro-duodenal dilation) is due to pressure of the superior mesenteric artery, vein and nerve on the transverse segment of the duodenum. Observations of thirteen years on visceral ptosis subjects have demonstrated that when the coils of enteron lie in the pelvis, the superior mesenteric artery vein and nerve compress the transverse segment of the duodenum so that dilation begins in the transverse segment of the duodenum on the right side of the superior mesenteric vessels and nerve. This compression of the duodenum by the superior mesenteric artery, vein and nerve is typically manifest in a subject with splanchnoptosis or visceral ptosis, especially when lying on the back. It is not gastric dilation, it is gastro-duodenal dilation. When on the back the viscera, especially the enteronic loops, pass more and more into the lesser pelvis, dragging and tugging on the superior mesen-

tery artery vein and nerve, which compresses more and more the transverse segment of the duodenum. The general effect of splanchnoptosis is compromising of circulation (blood and lymph) and respiration, traumatizing nerve periphery, impairing elastic and muscular tone of abdominal wall and deranging secretions and muscular co-ordinations. Its results are malassimilation and neurosis.

Keith (239) emphasizes the fact that the kidneys rest on no visceral shelf as do the liver, stomach and spleen. There have been cases in which a floating right kidney has given rise to an obstruction of the bile ducts.

Goelet (175) called attention of the damage to the kidney by splanchnoptosis and says prolapse of the kidney has an important bearing on gynecological conditions. There can be no question about that. But it is also true that it is often overlooked as an etiological factor both in producing and in maintaining congestion of the pelvic organs and in producing symptoms which are referred erroneously to the pelvic organs.

The kidney, when prolapsed, overlaps the ovarian vein as it ascends along the spine and compresses this vein, thus obstructing the return circulation from the pelvis. When corset or clothing constricts the waist this condition is aggravated. The intestinal distention always associated with this condition is an important factor in forcing the kidney back against the spine. It would seem that the kidney being movable would escape this compression, but the colon, being attached to the kidney, drags upon it and holds it at the waist line, favoring compression. Prolapse of the kidney can interfere in the ovarian vein circulation in another manner. Think of the relation of the ovarian vein to the ureter; the vein in front and the ureter behind, when they cross. Now, when the kidney descends the ureter becomes bent upon and drags on the vein. Thus it will be seen that the prolapsed kidney is an important agent in causing con-

gestion of the pelvic organs and in creating consequent diseased conditions.

Treves (489) believes that the affection is most common in women. There is no definitely assigned cause; over exertion, repeated pregnancies and injuries all play a part. The first part to descend is the right band of the transverse colon, then the stomach is drawn down, the pyloric opening is compressed and passage of food hindered. The orifice between the duodenum and the jejunum is narrowed and intestinal contents obstructed in passage. Small intestinal mass prolapses, lower part of abdomen if flattened, liver and kidney become movable.

POSITION OF THE STOMACH IN VISCEROPTOSIS.

Groede (183) says the stomach is fixed at two points, at the pylorus and at the cardia. Aside from this the neighboring organs and the abdominal walls offer their respective supports. The points of fixation are naturally most strongly weighted when the individual stands. In a "hanging belly" the sack of the stomach is shown by the Rontgen Rays to lie very deep. Also under normal conditions a change of position of the caudal stomach poles may be observed. When the intestines are full we see it change. The consequence is a narrowing of the rest of the stomach lumen. Therefore descent of the caudal stomach poles is not at all identical with descent of the stomach. In many cases it is not possible for the stomach to regain its normality when it is pushed too far downward. Then the entire weight comes on the two fixed points of support. That the pylorus can change its position in pathological cases is known, but since the cardiac end is fixed in the diaphragm it cannot move.

Meinert (327) writes at great length upon the normal and pathologic positions of the stomach. In the newborn the stomach is vertical, but it soon assumes the position described by Luschka. This remains through life unless influenced by bad conditions. After

the sixth year the vertical position is again present, in direct proportion to increasing age. This is especially true in girls. Fifty girls were examined at a public school; gastrop-tosis was present in eighty per cent. among girls of fourteen years. Among women examined, ninety per cent. presented gastrop-tosis. In gastrop-tosis the cardiac end of the stomach remains fixed at the twelfth dorsal vertebra, while the pylorus moves downward, leaving the epigastrium free of gastric tympany.

Steele (454) states that in splanchnoptosis the stomach approaches a vertical position and its shape has been compared by Killing to a fish hook. Glenard's theory that all displacements of the viscera arise from the presence of adhesions, causing displacement from mutual traction, is now generally held to be untenable.

Donath (108) in writing upon visceroptosis says: Obrastzow (in 1888) made observations in connection with enteroptosis and concerned himself principally with the location and borders of the stomach. He found the lower border of the stomach in men and women to be most frequently in the lower supra-umbilical third (this was the case in working women more than in those of leisure). In children under fifteen years the stomach seldom reaches the navel, in adults after fifty years the stomach was usually under the navel. The position of the stomach is a most important influence in the predisposition to enteroptosis.

DeNeit (97) believes that the determination of the lower border of the stomach is always made with reference to the normal position of the umbilicus—i. e., a point midway between the ensiform process and the pubis. He examined women only, fifty-eight in all. In thirteen he found gastrop-tosis, in eleven sub-vertical position, in seventeen a combination of these conditions, in eleven normal relations, while in six the exact condition could not be well determined. In every case he determined Rosenheim's (the greatest diagonal measurement) the height and breadth of the organ, and the position of the pylorus.

Berry (25) from an examination of fifty stomachs concludes that a cardiac valve is constantly present, or at least in fifty per cent of all cases of splanchnology. This valve, which projects downward from the upper and posterior portion of the cardiac opening, has a crescentic shape, it is small, but is supposed to be functional. It is suspended and may swing either way and its resistance may be easily overcome by the acts of eructation and vomiting. The pyloric orifice was determined definitely to be oval (14 mm by 18 mm) with the longest axis running obliquely from above down and backward; occasionally the direction of the axis may be vertical or horizontal. One rare occurrence was found in several cases—viz.: accessory pyloric valves of crescentic shape, and variably situated. The greatest width was 13.1 cm., and the length from top of fundus to the lowest point of the greater curvature 27.8 cm. Transverse diameter, contained two and one-half times in the vertical, was shown by comparison to exceed the antero-posterior. In the woman the cardiac valve is more frequently found. There is also a greater difference in the small and great curvature. In the male it is as 1 to 3.

Chambers (58) says with regard to gastrop-tosis it is rare to see displacement of the cardia. This is probably the only point of the stomach which is not freely movable. The pylorus is usually displaced downwards, sometimes below the navel. Form and position of the stomach are determined principally by the location of the pylorus and lesser curvatures. The concavity of the lesser curvature becomes less and is directed more to the right. The pylorus is sometimes prolapsed so as to produce an almost vertical position of the stomach as at birth. There is a loop or crescent displacement in women whose abdominal muscles are much relaxed.

THE X-RAY IN VISCEROPTOSIS (AND IN GASTROPTOSIS IN PARTICULAR.)

Worden (532) made a study of forty cases of gastric or gastro-intestinal symptoms. The

following methods were used: Inspection, percussion, auscultatory percussion, auscultation with the tuning fork, inflation with carbonic acid, gas or air, illumination by the electric diaphone with the aid of fluorescent solutions, and the use of the skiagraph. In some cases skiagraphs have shown marked prolapse, which repeated physical examinations had failed to note. The upper curvature and the pylorus were shown very clearly. Mechanical difficulties in stomach drainage can be recognized especially when the stomach bends sharply. In these forty cases the skiagraphs showed gastropnoptosis in thirty-one. The degree of ptosis varied from cases in which the lower border reached the umbilicus to cases in which the descent of the stomach was complete.

Leonard (286) states that in one case of gastropnoptosis he was able to obtain a good view of the stomach's location by first washing it and subsequently introducing an emulsion of bismuth. He then examined the patient with the fluoroscope.

Pancoast (353) says in order to obtain a picture of any particular structure of the body, that structure must be capable of absorbing the rays to either a much greater or a much less degree than the surrounding tissues. A collection of gas in the colon is represented on the plate as a darker area because the gas displaces the soft structures which throw a shadow, while it offers practically no obstruction to the passage of the short ether waves. The primary object of the radiographic examination of suspected gastropnoptosis is to determine the presence of the ptosis and its degree. But the radiograph will do more than this since it also may reveal possible factors in the etiology of the condition or suggest the appropriate therapeutic measures and it will frequently demonstrate the anatomical results of treatment.

Einhorn in 1889 introduced an electric light into the stomach making it transparent through the abdominal wall. This gastro-diaphany has been superseded by the X-ray.

SYMPTOMS AND DIAGNOSIS.

Whether it be the stomach, intestines, or kidney which is to the front in the disease-picture is of but little consequence, they all belong to one great symptom-complex. The prominence of one organ over another determines only the vulnerability of that organ. Again, all of these organs may be badly dislocated, giving rise to no distinct symptoms, but rather to that obscure train of intestinal indigestion and slight abdominal discomfort which is believed to be consequent upon some degree of visceral dislodgment.

Lea (274), Donath (107), Ratterman (385) have written upon and emphasized the more common symptoms of splanchnoptosis as borborygmus, eructations, malaise, nausea, vomiting, faintness, headache, irritability, constipation, constipation alternating with diarrhea, palpitation, neuralgia pains, occipital pains, spinal, referred to the organ, oppression and fever.

Ratterman (385) also called attention to the "floating rib of Stiller" as a significant sign.

Schwerdt (438) speaks of Glenard's "Proof of Pressure," which is as follows: Both hands are placed below the navel and an equal pressure above and below is made. If splanchnoptosis is present the patient at once feels a great relief. This writer also calls attention to the fact that in splanchnoptosis the anterior abdominal wall was often distended with gas, but depressed in the center and flattened in its entire breadth; was sometimes so thin that the intestinal knots could be seen through it and by peristaltic unrest it was moved up and down.

Dawson (89) states in reference to the diagnosis of gastropnoptosis that the subject is frequently spare and stoops, that the skin is dry and lax, and the thorax elongated.

Ewald (133c) has made some bold corrections on Glenard's symptomatology. One is that the epigastric pulsation of the aorta is in no manner a pathognomonic sign of enteroptosis as this symptom is always present when-

ever there is relaxation of the diaphragm and marked emaciation.

Kuttner (261) states that in all cases of this malady there seems to be a considerable reduction in the hemoglobin of the blood, thirty-eight cases that they counted giving an average of 77.2 per cent.

Mager (305) says the facial phenomena which was first observed in tetanus, the convulsive movement of the entire facial area, or a part of it by percussion, has since been found an accompaniment of other diseases. He has observed it in 40 cases of enteroptosis and in various degrees. Usually it has been double-sided. He considers this facial phenomena, as in tetanus, to be caused by intestinal disturbances, having their origin in auto-intoxication. By therapeutic influences on the intestine it can be made to disappear. The intestinal disturbances in enteroptosis are primary, and the facial symptoms secondary. The question why following intestinal disturbances, facial convulsions should sometimes appear, and sometimes tetanus, is answered by Mager, that tetanus requires in addition an insufficiency of the epithelial corpuscles of the thyroidae.

Lockwood (298) has made a study of forty-five cases in age from 20 to 70 years, thirty-six cases were between 25 and 50 years, the "storm and stress" period. Laxity of the abdominal wall was not a marked feature. Right kidney displacement in one half of the cases. Did not find the corset responsible for a single case (this contrary to Flexner and Meinert). Only one case showed chlorosis. He disputes the statement of Meinert that gastropotosis exists in every chlorotic girl. Stiller's sign of neurasthenia, the mobility of the tenth rib, was not always looked for, but when sought the rib did not seem to be detached. He thinks that gastropotosis is more common among the upper classes and more in private practice than in hospitals.

Again this same writer (299) among 2,000 patients has observed gastropotosis in 351 cases,

making 17.5 per cent of all gastric and intestinal cases due to gastropotosis. This is more than twice the frequency of gastritis, the latter being only 8 per cent. There is a great similarity in the clinical histories of these 351 patients, so that it may be asserted that gastropotosis runs a course which is typical and characteristic. Neurasthenia, with its varied symptoms, is proportionate to the advance of the disease; it contributes a great variety of symptoms of increasing severity. Constipation is present and is due to the atony of the colon. Often the colon sags in its transverse portion. The "habitus enteropticus" is present. This means the long narrow thorax and abdomen and a costal angle under ninety degrees. The sharper this angle the more disposition to splanchnoptosis. He regards the enteroptic habit as one of the most important conditions in gastric pathology.

Hamilton (195) observes that when the abdomen is pendulous, the nervous features are less pronounced than in the subject with the abdomen flattened. Typical enteroptosis may result from inflammatory processes in the abdomen. Any of the abdominal organs may be displaced in the disease. The colon, small intestines, stomach, right kidney and liver, are the first to alter their relations. This condition is due to an atony of the nervous system with a corresponding relaxation of the muscular structures of the body. The diagnosis is comparatively easy. The epigastrium is hollow, the two lower quadrants of the abdomen are quite prominent even when the patient is reclining. The lesser curvature and its relation to the greater curvature is most important to ascertain. If the lesser curvature can be demonstrated, some displacement exists. The amount of displacement is to be measured by the relation of the lesser curvature to the umbilicus. Palpation usually reveals a movable kidney, and the liver, when displaced, is usually more prominent in the epigastrium; it may be easily rotated on its long axis.

Aaron (1) says epigastric pulsation is fre-

quently present, constipation always, nervous symptoms are pronounced.

Treves (489) states that the symptoms are many and distressing. Irregular bowels, with constipation as the rule, occasionally diarrhoea. Stomach and intestines usually dilated.

Brown (51) says the symptoms are many. Urine, blood and gastric juice are generally normal, but tenderness is usually revealed in the epigastrium, lax tension of abdominal wall and a cord-like transverse colon, Glenard's "corde transverse colique."

Glenard (168) says the malady of "ptosis" is a "sickness of every day." Among 100 patients suffering from trouble of the general classification of "intestinal gastro-dyspepsia" thirty have ptosis as the cause of the dyspepsia or the neuropathy. If the practitioner does not recognize the pathogenic ptosis he will be impotent to influence the disease, he will cure the patients if he makes the right diagnosis. It has a symptomatology, a pathogenesis an evolution and a treatment which is peculiar to itself. Under the name of splanchnoptosis is expressed the idea of a simultaneous of all the other ptoses. Multiple ptoses have been demonstrated frequently in the same subject. The term enteroptosis designates not alone the prolapses of the intestine but an "ensemble" of all the symptoms which accompany the existence of one or more ptoses in the same individual. Enteroptosis may exist without nephroptosis and without hepatoptosis, but the reverse is not true. Gastropptosis is always associated with enteroptosis, the one is not without the other because of the anatomical connection of the intestines and of the stomach.

This same writer again emphasizes (167) that the indirect signs of gastropptosis are taken from the organs in which prolapse is easier recognized than those of the stomach and are implicated by their anatomical connections with the viscera. The direct signs of gastropptosis are the perception of relief in front of the vertebral column by the procedure of gliding (if

the subject is much emaciated), relief of the pancreas, relief of the superior plicature of the stomach, relief of the stenosis of the transverse colon. But there is another sign indicated at the seat of the large curvature and is at the same time a sign of gastropptosis; that is the sound of the gastric gurgling in the sliding. This is a sign that the gastropptosis is limited to the pyloric region that the great tuberosity is not reduced and that the cardia is in place at the twelfth dorsal vertebra, this is "partial gastropptosis," what Bouvert calls the "vertical dislocation" of the stomach.

TREATMENT.

Edebohls (121) presents a synopsis of the various mechanical means which have been devised for the fixation of movable kidney in nephroptosis. (1) Simple bandages and apparatus embodying a special kidney pad. (2) Simple bandages supporting entire contents of the abdomen sustaining and somewhat immobilizing the movable kidney or kidneys, on top of intestinal mass. (3) Relief is either from an elastic bandage sustaining lower two-thirds of abdomen or from a long low reaching corset. (4) Relief obtained in any case will depend upon the presence and the degree of associated enteroptosis. Greater enteroptosis, greater relief from bandage or corset. Kidneys movable without general enteroptosis get little relief from apparatus. (5) All forms of apparatus with special kidney pads or trusses are to be rejected. They are impotent to fix and sustain a movable kidney and the pressure is injurious to either the kidney or a neighboring organ especially the vermiform appendix. (6) Where relief cannot be obtained from proper apparatus nephropexy is indicated.

Gunzburg (186) says that relaxation of the peritoneum with depression and abdominal movement of the viscera, causes such varied suffering that there is a constant therapeutic striving for a remedy. If neglected or only treated by massage, bandages, etc., the relaxed abdominal wall becomes almost incap-

able of functional activity, and has a relaxed extension of the abdominal cavity as a natural sequence. Patients and physicians seek to remedy the trouble by taking less food. No wonder that the fatty tissues are used up and the abdominal organs are rendered movable, but abnormally so. These patients should be at once put upon a nutritious and sufficient diet. But fluids should be moderately indulged in as they depress the stomach still further. Any kind of "water cures" would utterly fail in enteroptosis, many of these cases are very much troubled with gas. The yeast-medication obviates this formation perceptibly and he recommends it in many cases.

Rotgans (417) states that in cases of enteroptosis and "floating" kidneys he employs a bandage which he has made from a gypsum model. It consists of a large pelote whose lower border lies directly over the symphysis and the "Poupart" bandage. This acts in such a manner that by the upward pressure of the abdominal viscera the kidneys get a better support. The pelote is fastened with two steel pins which by means of two soft pelotes is placed against the sacrum. The lower abdomen is wrapped in a broad girdle of plaster. Before the plaster hardens the hand is laid over the symphysis and both regions of the groin laid flat on the plaster bandage, and pressed flat gradually. The pressed place of the plaster model gives the shape to the pelote.

Bassler (22) advises the wearing of a support for a number of weeks after confinement. An attempt also should be made to strengthen the abdominal muscles by frequently repeated voluntary contractions of the recti below the umbilicus; also in a dorsal position elevate the thighs, the legs being at the same time extended, elevation of the body to an erect position, the feet being held down. When faithfully carried out it will render operation unnecessary and incidentally add weight.

Blecher (37) says that operative treatment of enteroptosis is rapidly taking the place of

the old method of bandages. Radical operations of the nephroptosis paved the way. Hartmann, in 1899, performed an operation for vertical dislocation of the stomach. But still this method has not yet reached perfection. In the fastening of the stomach the same methods cannot be used as with the kidneys. They have a broad and solid growth with the back abdominal wall. The stomach, on the contrary, is an organ that normally is influenced by every change in the filling of itself or of the intestines, and by every alteration of the abdominal pressure; within certain limits its position is being constantly changed. An ideal gastropexis must fasten the stomach without curtailing its mobility in relation to the peritoneum and other organs. The bad influence of the dislocation by enteroptosis on the movement of the contents of the intestines has been much argued. Glenard gives it as his opinion that dyspepsia is the consequence of enteroptosis, and that neurasthenia is caused by it. In the author's own case the shortening of the ligamentum gastrohepaticum, causing relaxation of the parts running in it, was sufficient to bring about recovery, without fixation of the stomach. The chief cause of the troubles in the superextension of the suspensory ligaments must be sought, for the dislocation of the flexura duodeni and the impeded mobility are seldom, or in a slight degree, to be considered. This applies to the stomach and all depressed organs. The enteropexis seems not to be indicated as long as the enteroptosis is still in the incubation stage; the languor which is present must be controlled and prophylactically tested to retain the elasticity of the epigastric area, and an avoidance of all injuries which would encourage the enteroptosis.

Curti (85) is of the opinion that splanchnoptosis is a hernia of all the viscera whose sack is through the abdominal wall. For a cure the exits must first of all be narrowed. He had a clinical case of plastic abdominal

suture. He made an incision from the upper abdominal region to the os pubis in the abdominal wall and took off the ring of the navel. Pulled the Mm. recti out of its back connection and sutured the back muscle connection of the M. rectus and the peritoneum of one side with the back connection of the M. rectus and the peritoneum of the other side, so that the two peritoneal surfaces came together; in this way he left a lobe measuring 4 cm. on each side. This flap he brought under the M. rectus of the right side and fixed it here with a single suture. Then the Mm. recti were laid upon each other and sutured and opened their exterior connections and sutured the skin. The result was good.

Hodge (220) reports a case of gastropotosis. Laparotomy in the middle line below the ensiform. Lesser curvature about half way to the umbilicus, greater curvature three-quarter inches below the umbilicus. Pylorus opened, gall bladder normal. Three transverse rows of interrupted silk sutures were put in the gastro hepatic ligament, bringing stomach well up under the liver. Abdomen closed in layers. Perfectly well in three months.

Crede (73) states that of all the operations relating to the intestinal canal and the stomach that gastro-enterostomy is to be regarded as the most important. Wolfier was the first to perform this operation on the front side of the stomach. Hacker followed, performing his operation on the back side. Both methods have since been used by numerous surgeons with some modifications.

Coffey (65) describes a new operation for gastropotosis. The omentum as it comes off from the greater curvature of the stomach is attached to the abdominal wall. The sutures are introduced about one inch from the stomach, and in such a manner as to avoid the large blood vessels. In one of the cases operated upon, the lesser curvature of the stomach was almost two inches below the umbilicus. The omentum was stitched to the abdominal

peritoneum about one inch above the umbilicus by means of a chromicized catgut suture. The result in the two cases operated were entirely satisfactory. The first case has practically no disturbances of digestion now, while previous to operation her suffering had been extreme.

Duret (114) recommends elevation of the stomach in gastropotosis. His operation is as follows: Continuous fine silk suture from right to left through first the fascia, muscle and peritoneum of the abdominal wall, and the serosa and muscularis of the stomach, near the lesser curvature; then twice, at short intervals, through the parietal peritoneum (left intact in the incision) and the serosa and muscularis of the stomach, following the line of lesser curvature, and finally through the peritoneum muscle and fascia of the abdominal wall of the opposite side. This suture placed in the wound just below the xiphoid cartilage, suture knotted and stomach elevated and lesser curvature firmly fixed to abdominal wall. Two years later patient's health much improved, had gained twenty-five pounds.

Rovsing (419) makes a distinction between women who have a virginal strong abdominal wall and those who have borne several children in cases of splanchnoptosis. The abdominal wall of the latter is very frequently weak, relaxed and dependent. The virginal splanchnoptosis affords the most operative treatment. In a movable kidney case Rovsing has been successful in 73 out of 75 cases. He recommends operative treatment of splanchnoptosis in women when the patient can get no relief from apparatus and in virginal form even more.

Terrier and Auvray (469) write on the surgical treatment of movable liver. Glenard called movable liver hepatoptosis. In partial hepatoptosis a part of the liver becomes hypertrophied and forms a movable lobe. In total hepatoptosis the entire liver is dislocated and there is an abnormal mobility. The his-

tory of hepatoptosis has been for a long time in the purely medical domain. The first observation seems due to Heister (1754); Lubauski (1843) wrote on the same subject; Cantani (1866); Blet (1876); Legg Wickham (1877); Muller (1882); Landon (1885); Glenard (1885). But the last named author had enteroptosis for his chief object and the liver only as it was associated with enteroptosis. Billroth (1884); and Tscherning (1886) performed the first partial operations by fixing the floating lobe of the liver to the abdominal wall. Gerard Marchant (1891) in a case of total hepatoptosis practiced the first total hepatopexia. Since then many operations for a dislocated liver have been published.

CONCLUSIONS.

1. That women who have borne children are peculiarly susceptible to nephroptosis.
2. That women who have borne children are peculiarly prone to splanchnoptosis in about the same ratio, 6 or 7 to 1.
3. That atmospheric pressure has nothing to do with the support of the abdominal viscera.
4. That the pylorus receives a complete peritoneal investment, and is therefore movable.
5. That the kidney is dislocated in a large per cent of women.
6. That the kidney is intimately bound to the pylorus.
7. That with the dislocation of the kidney the pylorus must move.
8. That the direction of dislocation in nephroptosis can be only downward, or more rarely downward and inward.
9. That the stomach in gastropoptosis shows a more vertical position characterized by pyloroptosis.
10. That there is an absence of the normal elasticity of the peritoneal and properitoneal connective tissue supporting bands in all the pelvo-abdominal viscera in cases of splanchnoptosis.

11. That replacement fibrosis in the ligament of Treitz tends to the further ptosis of the pylorus.

12. That ptosis of the pylorus means traction on the gall bladder, on the duct of Wirsung and on the duct of Santorini.

13. That ptosis of the pylorus means sinking of the stomach and transverse colon.

14. That sinking of the stomach and transverse colon means overstretching of the anatomic and physiologic support of the stomach, the gastro hepatic omentum.

15. That with coloptosis there is an angulation at the hepatic flexure and engorgement of the caput coli (appendicitis, typhilitis and perityphilitis.)

16. That with coloptosis there is a constriction of the superior mesenteric vessels with stasis and passive hyperaemia in the mucosa of the intestines.

17. That lavage is of value.

18. That rectal and colonic irrigations are of benefit.

19. That electric and hydriatric measures should be employed.

20. That properly fitting elastic binders laced very tightly upward are of the greatest comfort.

21. That operative intervention should not be recommended until palliative measures have been exhausted.

22. That gastro enterostomy is of only temporary, if any benefit.

23. That the operation of choice is Hodge (see 220.)

24. That the right kidney should be anchored in every instance.

Dr. Bryan has made an exhaustive search of the literature on the subject treated in the above article consisting of some 600 references, but the bibliography was so complete and exhaustive that we were unable to give the space to it. Any doctor interested in this subject will do well to procure a copy of the bibliography from Dr. Bryan.